NOTES ON TERTIARY SIRENIANS OF THE GENUS DESMOSTYLUS

By Harold Hannibal

[*Plates 11–12*]

During the past four or five years I have collected numerous teeth of extinct sirenians of the genus *Desmostylus* from the Miocene and transitional Oligocene-Miocene beds near San Jose, California.

The teeth of *Desmostylus* are of a unique type. When the tooth emerges from the gum it is made up of cone-shaped columns of enamel filled with dentine. As it wears it becomes a group of closely appressed enamel rings surrounding pits from which the dentine has been eroded.

A number of teeth together with bones and fragments of tusks were found in company with marine invertebrates in shell-limestone intercalated with the lower or buff sandstone member of the San Pablo formation on the San Jose Quadrangle between Monument Peak and the saddle where the road to Calaveras Valley crosses the first ridge of the Diablo Range. At a horizon only a few hundred feet higher a tooth was found in shell-limestone about a half a mile south of the saddle where the road to Mount Hamilton crosses the first ridge. A fragment of a *Desmostylus* tooth was also found in a mixture of limestone and rhyolite tuff interbedded with Monterey shale on the New Almaden Quadrangle northeast of the Guadalupe quicksilver mines. It was associated with *Pecten andersoni* Arnold and therefore comes from beds considerably older.

Desmostylus hesperus Marsh[1] on which the genus was founded was described from fragments of teeth and vertebræ collected by L. G. Yates in the Miocene of either Alameda or Contra Costa Counties, California. While the exact locality where the type was collected will probably never be known, the figure compares closely with a molar fragment found at the Monument Peak locality which lies only a few miles to the south. At several points in the San Pablo beds of Alameda and Contra Costa Counties I have seen fragments of vertebræ that I took to be sirenian remains and it is probable that Marsh's material came from this horizon.

The teeth from Monument Peak come from different parts of the mouths of many individuals. The most common teeth are first molar

[1] Marsh, O. C.; Am. Jour. Sci. Arts, CXXXV, pp. 94–96, fig. 1–3, 1888.

with seven columns and second and third molars with eight or nine columns, but the collection includes a milk molar with seven or more columns and two milk incisors, slender unicolumnar teeth. Fragments of two tusks having a length exceeding twelve inches and a diameter of an inch and an inch and a half, respectively, were obtained. They were found together and it is believed that they came from a lower jaw that may have held four tusks.

A second species of *Desmostylus* is found in Japan. In 1902, Yoshiwari and Iwasaki[2] described and figured a skull from the Miocene of Togari, province of Mino, which was subsequently named *Desmostylus watasei* Hay.[3] It differs from *Desmostylus hesperus* chiefly in the small anterior columns and heavier enamel of the molar teeth.

A third species occurs in the Oligocene of California and Oregon. In 1906 and 1911 Merriam[4] announced the find of teeth and tusk fragments of an unnamed *Desmostylus* in southern California, the San Joaquin Valley, and Yaquina Bay, Oregon. He figures (1911, p. 407, fig. 1a-1b) a molar tooth from the Monterey formation north of Coalinga (nw. $\frac{1}{4}$ sec. 29, T. 18 S., R. 15 E.) which belongs to the same section of the genus as *Desmostylus watasei*. Recently Hay[5] has figured as *Desmostylus hesperus* a skull and teeth from the mouth of Spencer Creek,[6] Yaquina Bay, Oregon. The molar teeth are characterized by heavy enamel, small dentine cores, and slender anterior columns as in *Desmostylus watasei* but the Yaquina skull is only about half the size of the Japanese skull with five columns instead of eight to the first upper molars and a corresponding reduction in other teeth.

Since the species is unnamed I propose to call it **Desmostylus cymatias** Hannibal, n.sp., from Cape Foulweather near where the Yaquina skull was obtained.

[2] Yoshiwara, S. and Iwasaki, J.; Jour. Coll. Sci. Imp. Univ. Tokyo, XVI (6), pp. 1–13, pls. I–III, four text figs., 1902.

[3] Hay, O. P.; Proc. U. S. Nat. Mus., XLIX, p. 396, 1916.

[4] Merriam, J. C.; Science, XXIV, pp. 151–152, 1906; Univ. Calif. Publ. Geol., VI, pp. 403–412, 11 text figs., 1911.

[5] Hay, O. P.; Proc. U. S. Nat. Mus., XLIX, no. 2113, pp. 381–397, pls. 56–58, 1916.

[6] I am unable to locate Spencer Creek no available maps but it cuts an area of Seattle shale and Monterey sandstone which are of Oligocene and Oligocene-Miocene age. Cf. Arnold, R. and Hannibal, H.; Proc. Am. Phil. Soc., LII, no. 212, pp. 582, 587, pl. XXXVIII, 1913.

The stratigraphic range of the three species is shown in the following table.

	CALIFORNIA	OREGON	JAPAN
Middle Miocene	*D. hesperus* in San Pablo formation of Monument Peak near San Jose		
Oligocene-Miocene	*D. cymatias* in Monterey formation north of Coalinga	*D. cymatias* in Monterey or Seattle formation at Yaquina Bay	*D. watasei* in Miocene of Togari, province of Mino

EXPLANATION OF PLATES

PLATE 11

Desmostylus cymatias Hannibal, n. sp.; Yaquina Bay, Oregon (after Hay, Proc. U. S. Nat. Mus., XLIX, pl. 58).

FIG. 1. Skull from left side. $\times\frac{2}{5}$. Explanation of numerals: 1, supraoccipital; 2, parietal; 3, frontal; 5, premaxillary; 6, maxillary; 7, lachrymal; 8, squamosal; 9, zygoma; 10, jugal; 11, capsule for second molar; 13, exoccipital condyle; 17, mastoid, 18, palatine; 27, tympanic cavity; 28, infraorbital foramen; 29, exoccipital.

FIG. 2. Skull from rear. $\times\frac{2}{5}$.

FIG. 3, 4. Supposed second molar. $\times 1$.

FIG. 5, 6. Supposed fourth premolar. $\times 1$.

PLATE 12

Desmostylus hesperus Marsh, $\times 1$; Monument Peak, San Jose, California.

FIG. 7. Fragment of a little-worn molar comparing closely to Marsh's type.

FIG. 8, 9. Worn second or third molar.

FIG. 10. Partly-worn second or third molar from another part of mouth.

FIG. 11. Partly-worn first molar.

FIG. 12. Fragment of an unworn milk molar which originally had seven or more columns.

FIG. 13, 14. Fragments of unworn unicolumnar teeth, probably milk incisors.

Stanford University, California.